

## TAD02 – A3 Practice (IR) MS

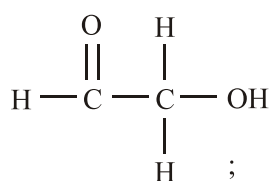
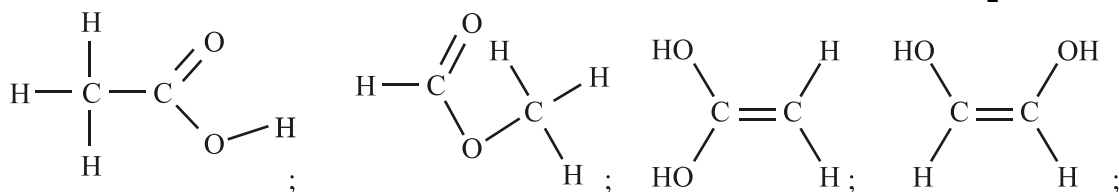
1. the bond in both molecules vibrates/stretches; only the stretching in H—I causes a change in dipole moment;

2

[2]

2. (a)

2



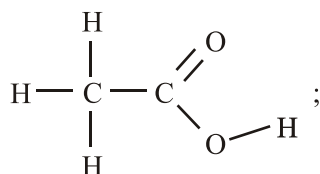
Accept correct cyclic isomers.  
If no H atoms shown [1 max].

- (b) 2920 cm<sup>-1</sup> C—H;  
2765 cm<sup>-1</sup> O—H (in hydrogen bonded acids);  
1710 cm<sup>-1</sup> C=O;

2 max

Award [2] for three correct, [1] for two correct.

- (c)



(because of) the position of O—H vibration;

2

[6]

3. (a) (C=O) 1680 to 1750 (cm<sup>-1</sup>);  
(C-O) 1000 to 1300 (cm<sup>-1</sup>);  
(C-H) 2840 to 3095 (cm<sup>-1</sup>);  
Award [1] for any two.
- (b) (O-H) 2500 to 3300 (cm<sup>-1</sup>);

1

1

[2]

4. (a) (i) A: beam splitter/(rotating) mirror;  
B: sample;  
C: control/reference/solvent;  
Accept B and C to be in inverted order  
Award [2] for three correct, [1] for any two.
- (ii) produces one frequency/wavelength;  
Accept narrow range.
- (iii) to convert radiation to an electronic signal;  
to compare (the intensities of) sample and control/reference beams;  
to determine the absorption (at particular frequencies);
- (b) vibrations excited to higher energy levels;  
the bonds bend/stretch;  
the dipole moment/polarity of the molecule changes;  
Award [2] max.

2

1

2

2

[7]